WIRE FEEDER

IM597

RETURN TO MAIN MENU

MK 091-0414
November 1999
Rev i

OPERATOR'S MANUAL

Cobramatic®

For use with Push-Pull Torches Model K1589, K1590, K1591, K1592

Safety Depends on You

Lincoln arc welding equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation...and thoughful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT**. And, most importantly, think before you act and be careful.

CE

OPERATOR'S MANUAL

World's Leader in Welding and Cutting Products

LINCOLN ELECTRIC

Premier Manufacturer of Industrial Motors

Sales and Service through Subsidiaries and Distibutors Worldwide

Cleveland, Ohio 44117-1199 U.S.A. TEL: 216.481.8100 FAX: 216.486.1751 WEB SITE: www.lincolnelectric.com

⚠ CALIFORNIA PROPOSITION 65 WARNINGS ⚠

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

The Above For Diesel Engines

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

The Above For Gasoline Engines

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE powered equipment.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.

1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.

1.c. Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.

1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.

ELECTRIC AND MAGNETIC FIELDS may be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. Do not work next to welding power source.

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ELECTRIC SHOCK can kill.

3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- **Semiautomatic DC Constant Voltage (Wire) Welder.**
- **DC Manual (Stick) Welder.**
- **AC Welder with Reduced Voltage Control.**

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".

3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.

3.e. Ground the work or metal to be welded to a good electrical (earth) ground.

3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

3.g. Never dip the electrode in water for cooling.

3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

3.j. Also see Items 6.c. and 8.

ARC RAYS can burn.

4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87. I standards.

4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

FUMES AND GASES can be dangerous.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases.When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**

5.b. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

5.c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

5.d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

5.e. Also see item 1.b.

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WELDING SPARKS can cause fire or explosion.

6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.

6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1 from the American Welding Society (see address above).

6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

6.h. Also see item 1.c.

CYLINDER may explode if damaged.

7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

7.c. Cylinders should be located:

- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.

7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.

FOR ELECTRICALLY powered equipment.

8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.

8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

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PRÉCAUTIONS DE SÛRETÉ

Pour votre propre protection lire et observer toutes les instructions et les précautions de sûreté specifiques qui parraissent dans ce manuel aussi bien que les précautions de sûreté générales suivantes:

Sûreté Pour Soudage A L'Arc

1. Protegez-vous contre la secousse électrique:

   a. Les circuits à l'électrode et à la piéce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vétements mouillés. Porter des gants secs et sans trous pour isoler les mains.
   b. Faire trés attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher metallique ou des grilles metalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
   c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état defonctionnement.
   d. Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
   e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
   f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces precautions pour le porte-électrode s'applicuent aussi au pistolet de soudage.

2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas ou on recoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.

3. Un coup d'arc peut être plus sévère qu'un coup de soliel, donc:

   a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
   b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
   c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.

4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.

5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans lateraux dans les zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.

7. Quand on ne soude pas, poser la pince à une endroit isolé de la masse. Un court-circuit accidental peut provoquer un échauffement et un risque d'incendie.

8. S'assurer que la masse est connectée le plus prés possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaines de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'echauffement des chaines et des câbles jusqu'à ce qu'ils se rompent.

9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particuliérement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumeés toxiques.

10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgéne (gas fortement toxique) ou autres produits irritants.

11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

PRÉCAUTIONS DE SÛRETÉ POUR LES MACHINES À SOUDER À TRANSFORMATEUR ET À REDRESSEUR

1. Relier à la terre le chassis du poste conformement au code de l'électricité et aux recommendations du fabricant. Le dispositif de montage ou la piece à souder doit être branché à une bonne mise à la terre.

2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.

3. Avant de faires des travaux à l'interieur de poste, la debrancher à l'interrupteur à la boite de fusibles.

4. Garder tous les couvercles et dispositifs de sûreté à leur place.

Mar. '93

Thank You —— for selecting a **QUALITY** product by MK / Lincoln Electric. We want you to take pride in operating this MK Products Inc. / Lincoln Electric Company product ••• as much pride as we have in bringing this product to you!

Please Examine Carton and Equipment For Damage Immediately

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, Claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Model Name and Sales SpecNumber (K-xxx) _____

Date of Purchase _____

Whenever you request replacement parts for or information on this equipment always supply the information you have recorded above.

Read this Operators Manual completely before attempting to use this equipment. There are some important topics covered in the manual about how this system works and how it is different than wire feeders you may be use to. Save this manual and keep it handy for quick reference. Pay particular attention to the safety instructions we have provided for your protection. The level of seriousness to be applied to each is explained below:

⚠ WARNING

This statement appears where the information **must** be followed **exactly** to avoid **serious personal injury** or **loss of life.**

⚠ CAUTION

This statement appears where the information **must** be followed to avoid **minor personal injury** or **damage to this equipment**.

The Wire Feeder - Gun section of the welding package is a push-pull system, which means that there is a motor in the wire feeder as well as the welding gun. These must both be set-up properly to achieve maximum benefit from the welding package.

The Wire Feeder – Gun section of the welding package is fully warranted by MK Products and Lincoln Electric and can be serviced at the MK Products Service locations listed inside the back cover of this manual.

Spare parts may be purchased from either company if so indicated by a part number in the respective company part number column in the parts listings.

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Section 1 SPECIFICATIONS

Wire Diameter Capacity ..... .030 - 1/16" ALL Types

Wire Capacity ..... 12" Standard
(Insulated or Non-Insulated)

Power Input ..... 42 VAC 50/60 Hz,
..... 150 Watts Peak (3 amps)

Weight ..... 31 pounds

Shipping Weight ..... 36 pounds

For Use with these Lincoln Torches K1589,K1590,K1591,K1592

Section 2 SUPPORT EQUIPMENT REQUIRED

C.V. or C.C. Power Source of Sufficient Capacity for Your Needs.

Regulated Gas Supply and Hoses.

Properly Sized Power Leads from Power Source to Wire Feeder and Ground.

Water Source and Hose Capable of Providing a Minimum of **1 qt/min. at 45 p.s.i**. when using water cooled torches.

Section 3 COOLANT RECOMMENDATIONS

1. Use a name-brand additive which does not contain reactive sulphur or chlorine and does not react with copper, brass, or aluminum.

2. Check coolant periodically to remain within limits of the following:

A. Coolant Flow rate - 1 quart/minute at 45 p.s.i.
B. Resistivity - 10K ohms/centimeter
C. Ph Range - 5.5-8.5
D. Particle Size - .005"

Section 4 OPTIONAL ACCESSORIES

Replacement Plastic Guides for Slave Motor

	Lincoln	*MK Products*
Inlet Guide	**S23980-1**	**753-0062**
Outlet Guide with Knob	**S23980-2**	**003-0428**

Section 5 INSTALLATION

5.1 LOCATION

The cabinet should be placed in a location where it can be protected from damage. Lead lengths and accessibility must also be considered when installing the cabinet.

5.2 42 VAC INPUT POWER CONNECTIONS

Your Wire Feeder comes factory ready with a harness to plug directly into all 14 pin Lincoln Power Sources equipped with 42 VAC auxiliary.

*The **42 VAC** is connected to the PC Board on terminal strip **J5 #1** (neutral) and **#2** (hot) and Ground to the Cabinet chassis.*

5.3 POSA START CONNECTIONS

Posa Start circuitry aids welding starts by sensing arc establish signals. A weld ground signal is required for this to circuit to work, which is provided through the Power Harness to the Power Source and is internally connected to the P.C. board on terminal strip **J6** terminal **2**.

Note: Place polarity switch to DCEP. Refer to scetion 7.3 for power supply settings to insure proper Posa Start operation.

WARNING: TURN THE INPUT POWER TO THE POWER SOURCE OFF AT THE DISCONNECT SWITCH BEFORE PERFORMING ANY WORK.

Section 6 WIRE THREADING PROCEDURE

6.1 WIRE SPOOL INSTALLATION

Release latches, and open right side door of cabinet.

Remove spool retainer from spindle hub.

Install wire spool onto spindle hub so that wire feeds from bottom of spool towards slave motor. Make sure that the hole in the spool aligns with pin on spindle hub. The white dot on the end of the spindle hub will aid in this alignment.

Replace the spool retainer.

6.2 THREADING PROCEDURE

Place wire size selector switch on front panel to the correct position for the wire being used.

Loosen end of wire from spool and cut off any kinked or bent portions.

Unreel and straighten out first 6" to 8" of wire.

Release tension from slave motor drive rolls.

Route wire into inlet guide, along drive roll groove, and into wire conduit.

Prevent the wire spool from turning with the palm of the right hand, and at the same time grasp the slave motor pressure adjusting knob.

Pull the torch trigger and slowly tighten the slave motor pressure adjusting knob until the slave motor stalls.

CAUTION:
EXCESSIVE DRIVE ROLL TENSION WILL REDUCE RATHER THAN IMPROVE WIRE FEED PERFORMANCE.

Tighten the torch pressure adjusting knob so the wire will be picked up and fed through the contact tip. Proper tension is achieved when wire does not slip if a small amount of pressure is added to the wire as it exits the tip.

6.3 PRE-SETTING SLAVE MOTOR TENSION

All Cobramatics have preset adjusting nuts which enables spools of the same wire diameter and type to be changed without further pressure adjustment after initial set-up.

To preset the slave motor tension bottom out the pressure adjusting knob by turning it completely clockwise.

Prevent the wire spool from turning and using a **9/16"** wrench adjust the preset nut until the slave motor stalls.

Correct pressure will now be achieved by simply bottoming out the pressure adjusting knob.

6.4 WIRE GUARD

The Cobramatic® Wire Guard is designed to keep the welding wire from jumping off the spool inside the wire feed cabinet. When the trigger is released and the brake engages, especially when using a new spool that is heavier towards the outside, the spool will tend to rotate more against the spindle drag adjustment.

However since the wire is held by the slave motor it will not move and could subsequently jump off the back of the spool and become lodged in the brake mechanism, or jump off the front of the spool and electrically short-out to the cabinet chassis. The wire guard will keep the wire from doing either.

The wire guard is designed to run inside the spool on top of the wire, and when the brake is engaged the wire guard will hold the wire onto the spool. The wire guard is made of a heavy woven nylon material that is resistant to wear and will not contaminate the surface of the wire.

Section 7 OPERATION

7.1 GENERAL

The AC slave motor in the feeder runs at a fast, constant speed, but has very low torque. It is always trying to feed more wire than the torch motor wants, and when the motor gets all it wants, it slows the slave motor preventing a bird's nest. Because of the low torque produced by the slave motor, a brake system is used to prevent wire overrun rather than tension. The drag adjustment in the spindle is used to keep the wire slightly taut, so it will not unspool while feeding wire. The 24 VDC torch pull motor is controlled by a solid state speed control and a potentiometer located in the torch.

7.2 FEEDER CONTROLS

7.2.1 ON/OFF SWITCH

Placing the switch in the "ON" position energizes the feeder circuitry and the power indicator light.

7.2.2 WIRE SIZE SELECTOR SWITCH

The wire size selector switch changes the torque of the slave motor for the

wire you are using. When in the **.030-.035** aluminum only position, the slave motor produces approximately **1 1/2 lbs**. inches and approximately **4 1/2 lbs**. inches when in the all other wires position.
(NOTE: Operating the cabinet with the switch in the wrong position will cause wire feed difficulties.)

7.2.3 POSA START CONTROLS

The Posa Start Run-in Speed Control, located on the front panel, provides adjustment for slow wire run-in. Once the arc has been established, the wire feed speed is automatically changed from the slow run-in speed to the welding speed set on the torch potentiometer.

7.2.4 TORCH AMPHENOL CONNECTORS

The Cobramatic® contains a 7 pin **"W"** clocked amphenol.

7.2.5 CONDUIT INLET

The Conduit Inlet provides access to the slave motor outlet guide.

7.2.6 GAS INLET

Provides access to the gas fitting inside the cabinet.

7.2.7 POWER INLET

The Power Inlet provides access to the power block inside the cabinet.

7.3 CV/CC POSA START OPERATING PROCEDURE

7.3.1 GENERAL

The Posa Start feature allows the Cobramatic® to be used in combination with constant current DC welding power sources of open circuit voltage in excess of 55 volts - also, any constant voltage welding power source capable of a minimum of 50 amps.

(NOTE: Reverse polarity MUST be used.)

CAUTION:
DO NOT OPERATE A COBRAMATIC® ON A POWER SOURCE HAVING A HIGH-FREQUENCY STARTING CIRCUIT BEFORE MAKING SURE THAT THE HIGH-FREQUENCY PORTION OF THE POWER SOURCE IS TURNED OFF. FAILURE TO TAKE THIS PRECAUTION WILL CAUSE PERMANENT DAMAGE TO THE POSA START CIRCUITRY.

The Posa Start Run-in Speed Control, located on the front panel, provides adjustment for slow wire run-in. Once the arc has been established, the wire feed speed is automatically changed from the slow run-in speed to the welding speed set on the torch potentiometer.

7.3.2 CV POSA START OPERATION

Attach Cobramatic® to CV power source according to the installation instructions.
Turn the Cobramatic® to the **"ON"** position and the Posa Start to the **"OFF"** position.
Adjust power source to desired voltage for your weld condition.

Depress gun trigger and adjust wire feed speed at gun to match voltage setting. If approximate wire feed is not known, it is better to start with excess wire feed rather than too little, in order to prevent a "burn-back".

Turn the Posa Start switch to the **"ON"** position. Press torch trigger and, using Run-in Speed Control, adjust wire feed rate to approximately 10% of welding wire speed set at torch.
Strike an arc, and adjust wire feed rate at gun until correct condition is achieved.

7.3.3 CC POSA START OPERATION

Attach the Cobramatic® to a CC power source according to the installation instructions.

Insure power supply high frequency switch is in the **"OFF"** position, and power supply is set to DC reverse polarity.

The power supply contactor should be set to **"Remote"** or **"Tig"** and the amperage control set to **"Panel"** or **"Standard"** depending on power supply. Turn the Cobramatic® power switch to the **"ON"** position and the Posa Start switch to the **"OFF"** position.

Adjust power source to desired amperage for your weld condition.

Press gun trigger and adjust wire feed speed at gun to match current setting. If approximate wire feed speed is not known, it is better to start with excess wire feed rather than too little, in order to prevent possible damage to the contact tip.

Turn Posa Start switch to the **"ON"** position. Press torch trigger and, using Run-in Speed Control, adjust wire feed speed to approximately 10% of welding wire speed set at torch.

Strike an arc; if the wire stubs out, reduce wire feed rate at gun, or increase amperage setting on power source.

NOTE: Because the Posa Start Run-in Speed always remains a percentage of the actual welding wire feed rate, the Posa Start run-in speed will always slow down or speed up proportional to any adjustment you now make at the gun. Therefore, if you slow down the welding wire feed speed, you will have to increase the Run-in Speed setting.

Section 8 MAINTENANCE

Maintenance of the torch will normally consist of a general cleaning of the wire guide system, including tubes, drive rolls, and conduits at regular intervals.

Remove spatter build-up from inside of nozzles with a hardwood stick.

The only parts on the Cobramatic system that are subject to normal wear are the conduit, contact tips, gas cups, front body liners, wire guides, drive and idler rolls. A supply of these parts should be maintained on hand.

If repairs do become necessary, any part can easily be replaced by a qualified shop maintenance man.

Your Cobramatic® is designed to provide years of reliable service. Normal wear and component failure may require occasional service.

The number of units in operation and the importance of minimal "down time" will determine to what extent spare parts should be stocked on hand.

8.1 TESTING THE TORCH

8.1.1 MOTOR CHECK

Remove the amphenol connector from the cabinet.
Using the torch amphenol, check the resistance across pins **"A"** and **"B"**(motor leads). The resistance across the motor should be between **5-10 ohms.**
If an open circuit or short exist, check the motor leads and motor independently.

8.1.2 TESTING THE POTENTIOMETER - "W" CLOCKED

Using the torch amphenol, check the resistance across pin **"D"** (wiper) and pin **"C"**. The resistance should vary from **0 - 5K ohms.**
Check the resistance across pin **"D"** (wiper) and pin **"G"**. The resistance should vary from **5K - 0 ohms**.

8.1.3 TESTING THE MICRO SWITCH

Using the torch amphenol, check for continuity across pins **"E"** and **"F"** when the trigger is pressed.

8.2 RELAY K2 OPERATION

When the torch trigger is pressed, 24VAC is sent to the coil of relay K2. When K2 is energized, AC is sent to the slave motor, spool brake, and the AC contactor. Relay K2 is also responsible for sending 24VAC to the speed control circuit and shorting the torch motor leads together when the trigger is released for the dynamic braking system. K2 also provides the closing contactor signal.

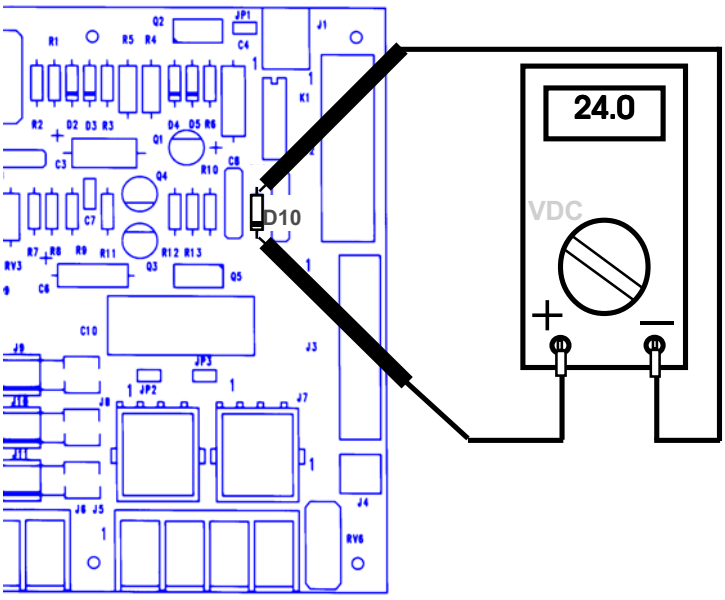
8.3 TESTING THE INPUT POWER CIRCUITS

The AC circuits are protected by fuses F2 and F3. If F2 and F3 continually blow, remove J4 (Brake Solenoid), J7 (slave motor) and J5-3,4 (AC Contactor) from the P.C. Board. Replace fuse, and retrigger system. If fuse does not blow; isolate the problem by plugging in J4, J7, and J5-3,4 one at a time until the fuse blows.

8.4 TESTING THE SPEED CONTROL

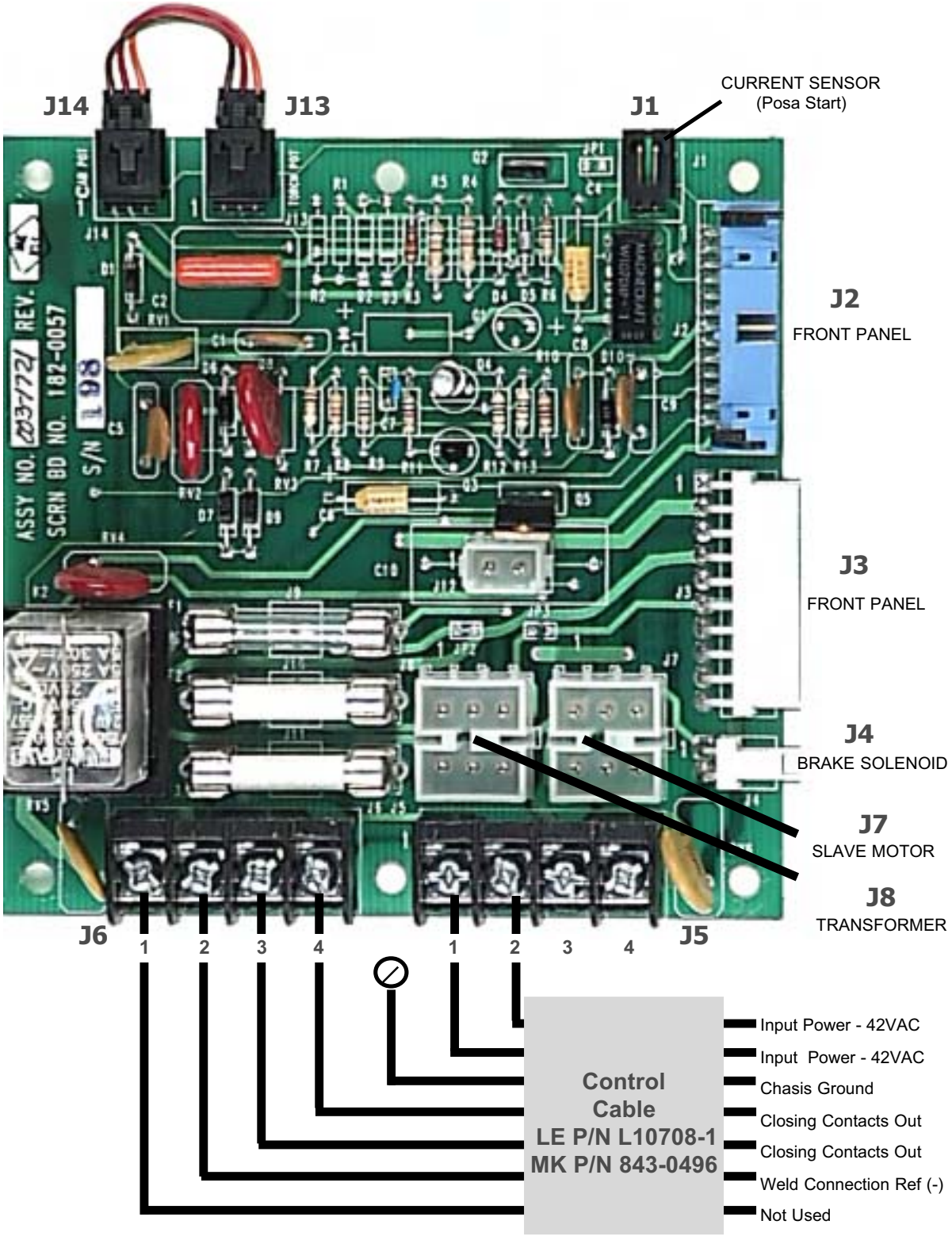
NOTE: *The torch should be tested first and the amphenol must be connected to the Cobramatic® to perform this test.*

Place a voltmeter across diode **D10** and press torch trigger. A reading of **0 - 24VDC** should be observed, as the torch potentiometer varied.



MAIN P.C. BOARD CONNECTIONS

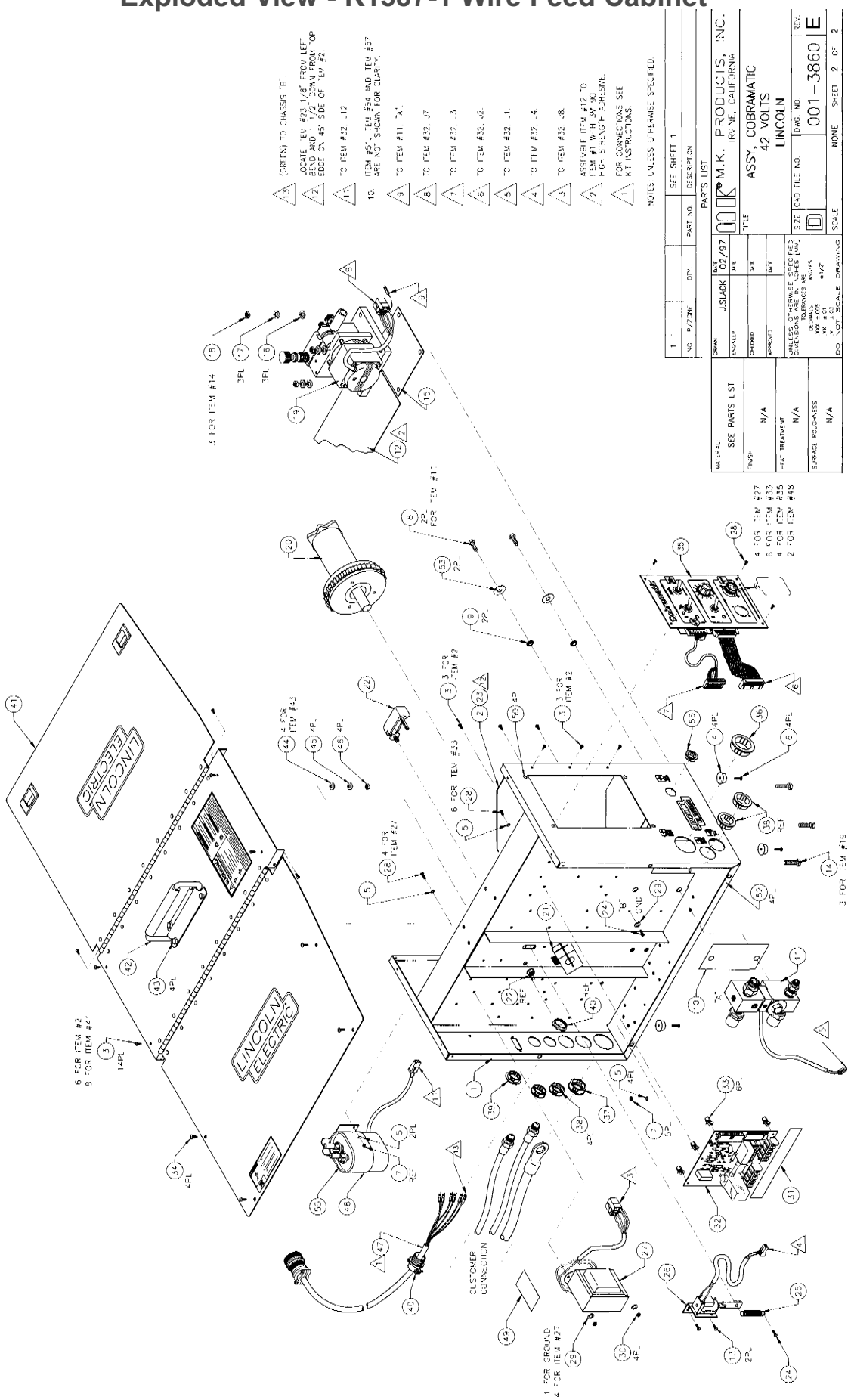
Note: For Cabinet - Remote Pot Kit, Remove Jumper from J13-J14. Plug Remote Pot Kit into J14.



TROUBLESHOOTING

TROUBLE	CAUSE	REMEDY
No wire feed at torch, feeder not operating, i.e., no slave motor or brake soleniod.	F2 & F3 (MDA7 7A Slow Blow) fuse in feeder blown.	Check AC circuit. Replace fuse
	F1 (4 amp) fuse in feeder blown.	Check motor leads for shorts, then replace fuse
	Micro-switch defective/not being activated. Broken electrical cable.	Replace switch. Check switch for operation. Check micro switch wires for continuity.
	Relay K2 inoperative.	Check/Replace relay K2.
	Loose J2, J3, P.C. board connector	Check J2, J3 connectors.
Brake soleniod inoperative.	Soleniod defective.	Replace soleniod.
	Relay K2 inoperative.	Check for 42VAC across J4-1 and J4-2
		Check relay K2 for AC not present.
No wire feed at torch, feeder operating properly.	Bad potentiometer.	Check potentiometer with meter.
	Bad torch motor.	Check/Replace motor.
	Broken electrical cable.	Check motor and potentiometer wires for continuity.
	Bad speed control/PCB.	Check/Replace P.C. Board.
Wire feeds, but welding wire is not energized.	Loose or no cable connections.	Check all power connections.
	Relay K2 not sending contactor signal.	Check/Replace relay K2.
	Contactor control cable loose or in wrong position.	Check power supply owners manual for location and type of contactor signal required, i.e. closing contacts or AC.
	Welding power source not working right.	Check power supply for proper operation.
Wire feeds erratically.	Excessive spool drag pressure.	Decrease spool drag pressure inside hub.
	Dirty or worn conduit.	Blow out or replace conduit.
	Incorrect pressure on drive rolls.	Adjust pressure at both feeder and torch.
	Idler roll stuck.	Check for lock washer under idler roll, or replace if damaged or worn.
	Wrong size contact tip.	See contact tip table.
Wire feeds one speed only	Bad potentiometer.	Check with meter.
	Broken electrical cable in lead assy.	Check potentiometer wires for continuity or shorts.
	Bad speed control.	Check/Replace P.C. Board.
Wire walks out of drive rolls	Idler roll upside-down.	Place groove in idler roll towards top.
	Rear wire guide missing.	Replace wire guide.

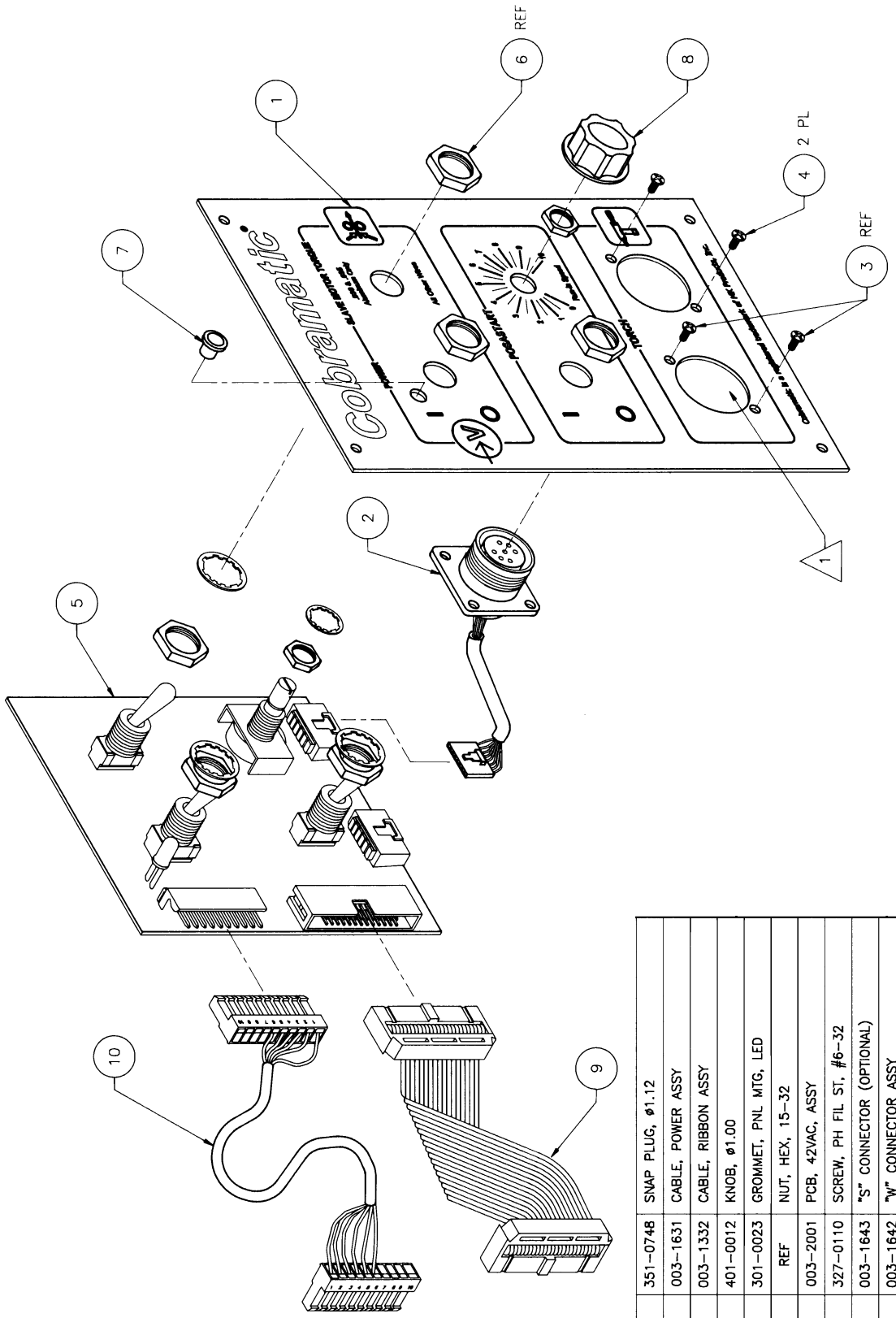
Exploded View - K1587-1 Wire Feed Cabinet



PARTS LIST - K1587-1 Wire Feed Cabinet

No.	Qty.	Part Number	Description
1	1	436-0122	Base, Cabinet, Screened, Lincoln
2	1	438-0019	Cover, Front, PCB, Lincoln
3	14	336-0038	Screw, PH Fil T/B #6-32 x 3/8
4	4	301-0103	Rubber Feet
5	16	333-0043	Washer, Int-Star #6
6	4	336-0006	Screw, PH Fil #6-32 x 1/2
7	6	341-0005	Nut, Hex #6-32
8	2	329-0003	Screw, Hex1/4-20 x 3/4
9	2	332-0009	Washer, Shoulder 0.265 ID
10	1	261-0105	Insulator Power Block
11	1	003-1674	Power Block Assy.
12	1	261-0104	Insulator, Spool
13	2	336-0037	Screw, PH Fil T/B #6-32 x 1/4
14	2	329-0005	Screw, Hex 1/4-20 x 1.00 LG
15	1	261-0372	Insulator, Slave Motor
16	2	331-0005	Washer, Flat 1/4
17	2	333-0009	Washer, Spring Lock 1/4
18	2	341-0010	Nut, Hex 1/4-20
19	1	001-1232	Slave Mtor 42V Assy.
20	1	003-0570	Spindle Brake Assy.
21	1	328-0112	Screw, Socket HD 3/8-16 x 1.00 LG
22	1	003-0784	Pawl Ratchet Assy.
23	1	405-0886	Decal, Warning (T13297)
24	2	327-0012	Screw, ST T/F #6-32 x 1/4 LG
25	1	419-0080	Spring Extension
26	1	003-2095	Brake Solenoid, 42V Assy.
27	1	003-1723	Transformer, 42V Assy.
28	16	336-0005	Screw, PH, Fil, #6-32 x 3/8 LG
29	5	331-0002	Washer, Flat #6
30	4	345-0008	Nut, Self-Locking #6-32
31	1	405-0909	Decal, Electronic Connection
32	1	003-1721	PCB, Main Assy.
33	6	342-0410	Apcer, Stacking #6-32 x 0.534 LG
34	4	336-0039	Screw, PH. Fil. #10-32 x 3/8 LG
35	1	003-2016	Assy, Panel, Front, Lincoln
36	1	351-0752	Bushing Snap 1.12ID, 1.50 Dia Mtg. Hole
37	1	351-0744	Bushing Snap 1.00ID, 1.375 Dia Mtg. Hole
38	4	351-0745	Bushing Snap 15/16ID, 1.125 Dia Mtg. Hole
39	1	351-0082	Cap Plug 7/8 Dia Mtg. Hole
40	1	411-0157	Clamp Cable Strain Rel.
41	1	003-2015	Assy, Doors, Lincoln
42	1	415-0243	Handle Carry
43	4	329-0219	Screw, Hex #10-24 x 1/2 LG
44	4	331-0067	Washer, Flat #10
45	4	333-0007	Washer, Spring Lock #10
46	4	341-0007	Nut, Hex #10-24
47	1	L10708-1	Control Cable, Lincoln 42V
48	1	435-3121	Holder Capacitor
49	0.25ft	261-0446	Mylar Tape
50	4	351-0086	Thread Insert #6-32
51	1	405-0894	Serial Number ID Plate, Lincoln
52	4	351-0089	Thread Insert #10-32
53	2	331-0049	Washer, Flat 1/4
54	4	411-0020	Tie Wrap
55	1	003-1798	External Cap Assy
56	1	351-0758	Bushing, Snap. dia3/4, Black
57	1	301-0087	Wire Guard

Exploded View - MK P/N 003-2016 Front Panel



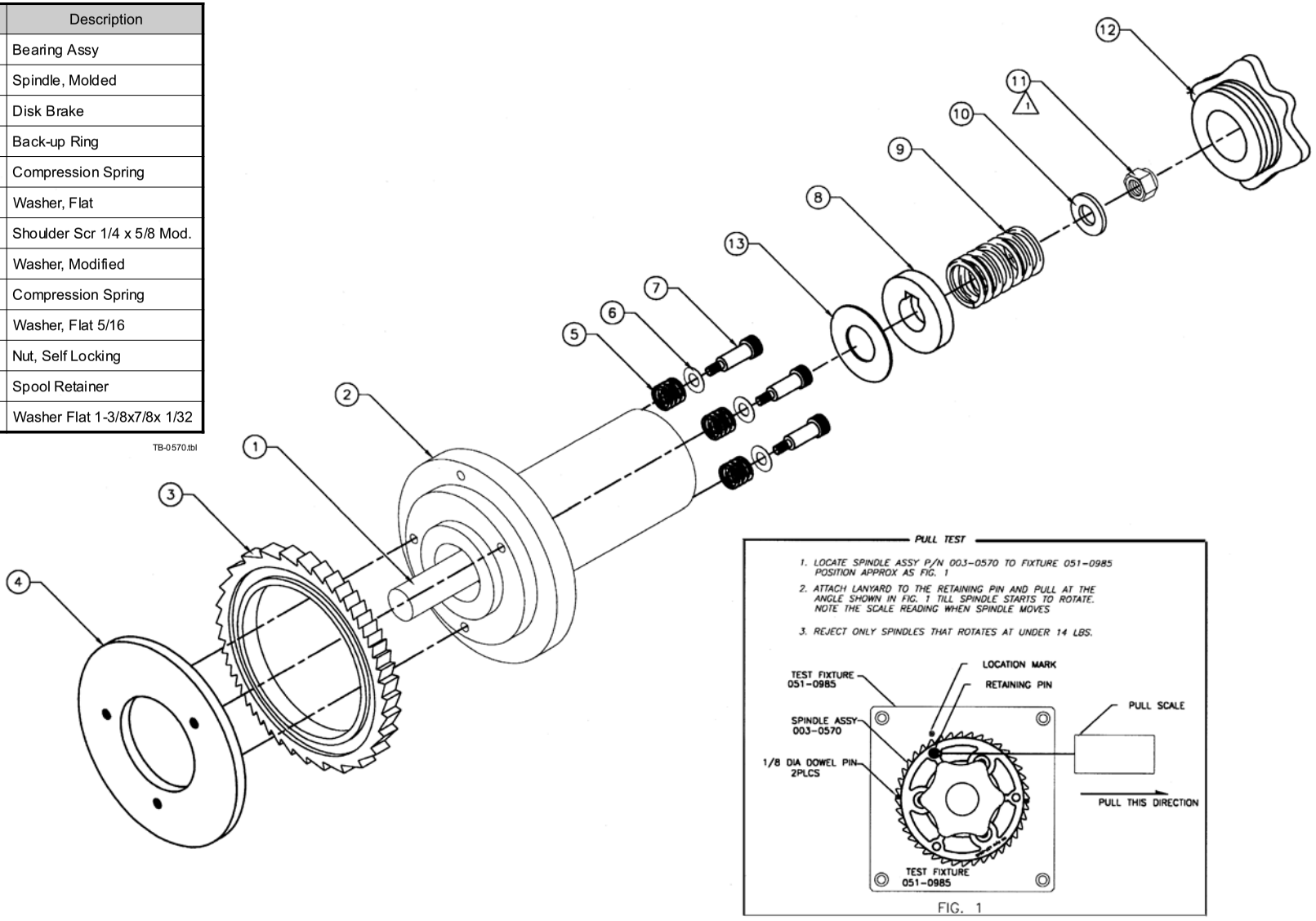
NO.	P/ZONE	QTY.	MK P/N	DESCRIPTION
11	1	1	351-0748	SNAP PLUG, ø1.12
10		1	003-1631	CABLE, POWER ASSY
9		1	003-1332	CABLE, RIBBON ASSY
8		1	401-0012	KNOB, ø1.00
7		1	301-0023	GROMMET, PNL MTG, LED
6		6	REF	NUT, HEX, 15-32
5		1	003-2001	PCB, 42VAC, ASSY
4		2	327-0110	SCREW, PH FIL ST, #6-32
3		REF/1	003-1643	"S" CONNECTOR (OPTIONAL)
2		1	003-1642	"W" CONNECTOR ASSY
1		1	436-0123	FRONT PANEL, LINCOLN

PARTS LIST

Exploded View - MK P/N 003-0570 Spindle Brake Assy.

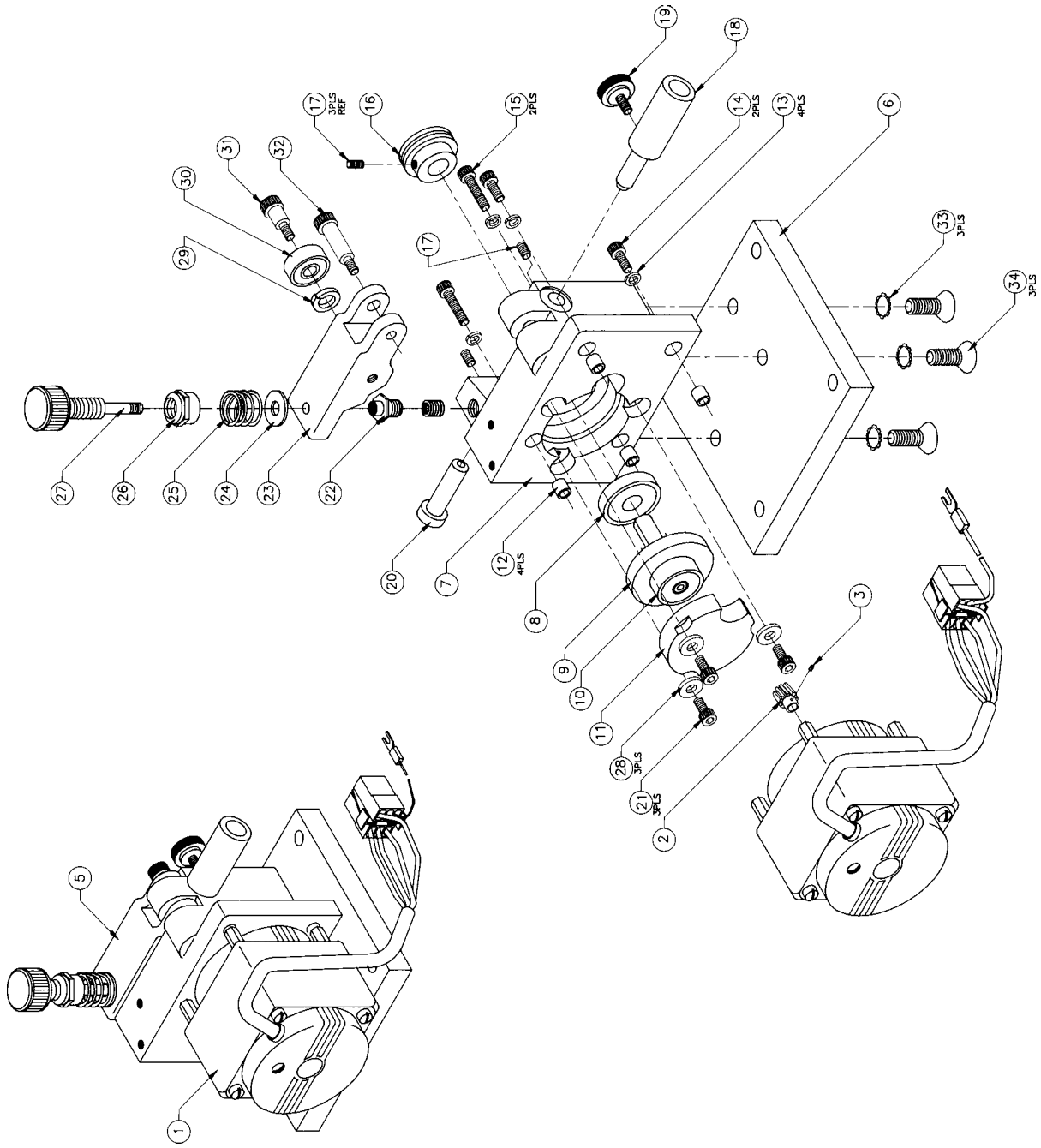
No.	Qty.	Part No.	Description
1	1	003-0569	Bearing Assy
2	1	437-0645	Spindle, Molded
3	1	723-0059	Disk Brake
4	1	431-1266	Back-up Ring
5	3	419-0059	Compression Spring
6	3	331-0063	Washer, Flat
7	3	330-3063	Shoulder Scr 1/4 x 5/8 Mod.
8	1	437-0180	Washer, Modified
9	1	419-0230	Compression Spring
10	1	331-0100	Washer, Flat 5/16
11	1	345-0018	Nut, Self Locking
12	1	431-0169	Spool Retainer
13	1	331-0200	Washer Flat 1-3/8x7/8x 1/32

TB-0570.tbl



PULL TEST
1. LOCATE SPINDLE ASSY P/N 003-0570 TO FIXTURE 051-0985 POSITION APPROX AS FIG. 1
2. ATTACH LANYARD TO THE RETAINING PIN AND PULL AT THE ANGLE SHOWN IN FIG. 1 TILL SPINDLE STARTS TO ROTATE. NOTE THE SCALE READING WHEN SPINDLE MOVES
3. REJECT ONLY SPINDLES THAT ROTATES AT UNDER 14 LBS.
TEST FIXTURE 051-0985
LOCATION MARK
RETAINING PIN
PULL SCALE
SPINDLE ASSY 003-0570
1/8 DIA DOWEL PIN 2PLCS
PULL THIS DIRECTION
TEST FIXTURE 051-0985
FIG. 1

Exploded View - MK P/N 001-1232 Slave Motor Assy.



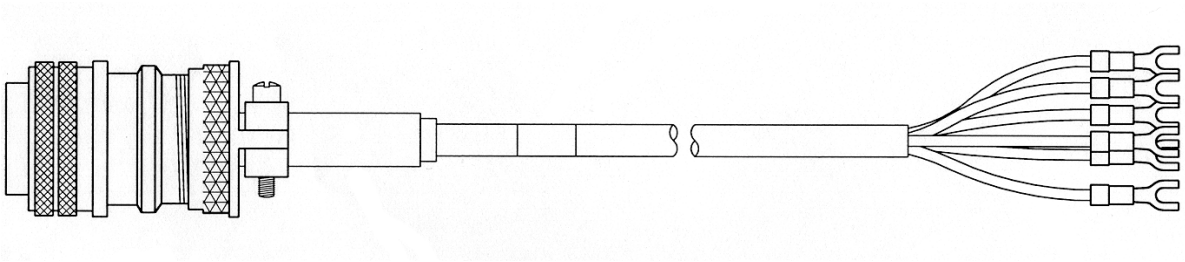
No.	Qty.	MK P/N	Description
			Parts List
34	3/REF	324-0286	Screw, flat hd 1/4-20 x 3/4
33	3/REF	333-0064	Washer c'sink int star 1/4
32	1/REF	330-0004	Screw, shoulder 1/4 x 3/4
31	1/REF	330-0001	Screw, shoulder 1/4 x 3/8
30	1/REF	501-0207	Idler roll-slave motor
29	1/REF	333-0009	Washer, lock spring 1/4
28	3/REF	331-0044	Washer flat #10
27	1/REF	003-0273	Pressure shaft, knob
26	1/REF	345-0047	Nut, adjust
25	1/REF	419-0211	Spring, comp. 0.62 od x 0.062
24	1/REF	331-0050	Washer, 1/4 id
23	1/REF	413-0209	Idler roll arm
22	1/REF	431-1082	Nut, stop shaft
21	3/REF	328-0024	Screw, socket hd #8-32 x 3/8
20	1/REF	753-0062	Guide, wire 1/2 dia.
20	1/REF	S23980-1*	Guide, wire 1/2 dia.
19	1/REF	003-0176	Knob, sub-assy.
18	1/REF	753-0062	Guide, wire outlet 5/8 dia.
18	1/REF	S23980-2*	Guide, wire outlet 5/8 dia.
17	2/REF	321-0060	Set screw #10-24 x 1/4
16	1/REF	511-0206	Drive roll-slave motor
15	2/REF	328-0029	Screw, socket hd #8-32 x 1.00
14	2/REF	328-0026	Screw, socket hd #8-32 x 5/8
13	4/REF	333-0006	Washer, lock spring #8
12	4/REF	342-0063	Spacer, 1/4 x 0.171 id
11	1/REF	431-0334	Cap
10	1/REF	501-0156	Cap bearing
9	1/REF	507-0130	Gear Shaft
8	1/REF	501-0118	Bearing reduction shaft
7	1/REF	431-0347	Gear reduction casting
6	1/REF	261-0213	Gear box insulator
5	1	001-1231	Gear box assy-slave motor
3	1/REF	421-0128	Spring pin 1/16 x 1/4 lg
2	1/REF	507-0128	Hel gear 24p-8t-0.33
1	1	003-1720	Torque motor s/a

* Lincoln Electric Part Number

Wire Harness for Input Power from Power Source

Plug for Lincoln Power Source

Wires terminated inside Cobramatic Cabinet

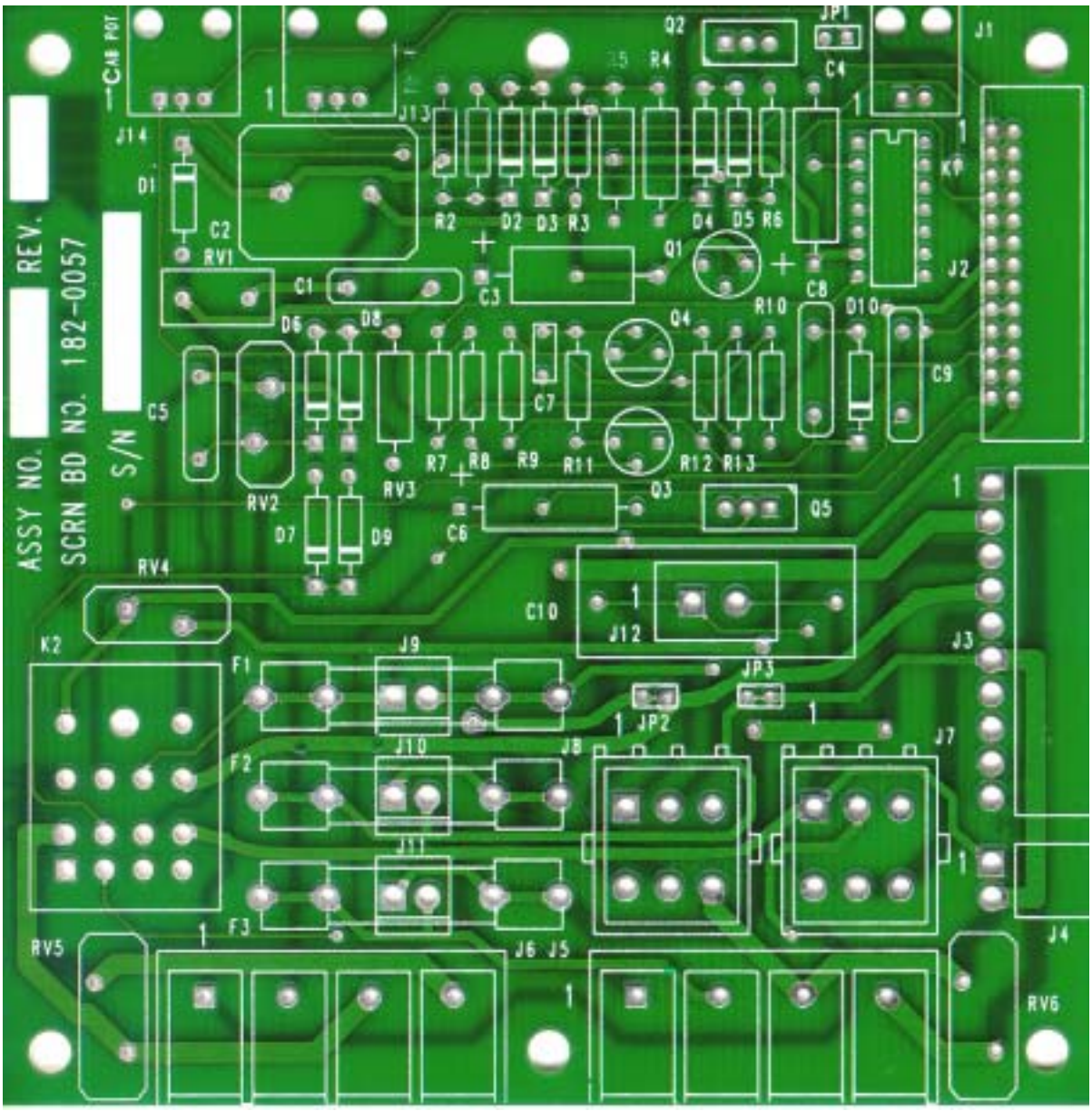


LE P/N L10708-1 (MK P/N 843-0496) **42VAC Interface Cable**

Control Cable Termination Chart

Function	Color Code	Lincoln 14 Pin Plug Receptacle	Cobramatic I Cabinet Terminal
42 VAC input	White	I	J5-1
42 VAC input	Black	K	J5-2
Posa Start ref. gnd	Blue	H	J6-2
Contactor	Red	C	J6-3
Contactor	Orange	D	J6-4
Ground	Green	B	Chassis

MAIN P.C. BOARD
PARTS PLACEMENT



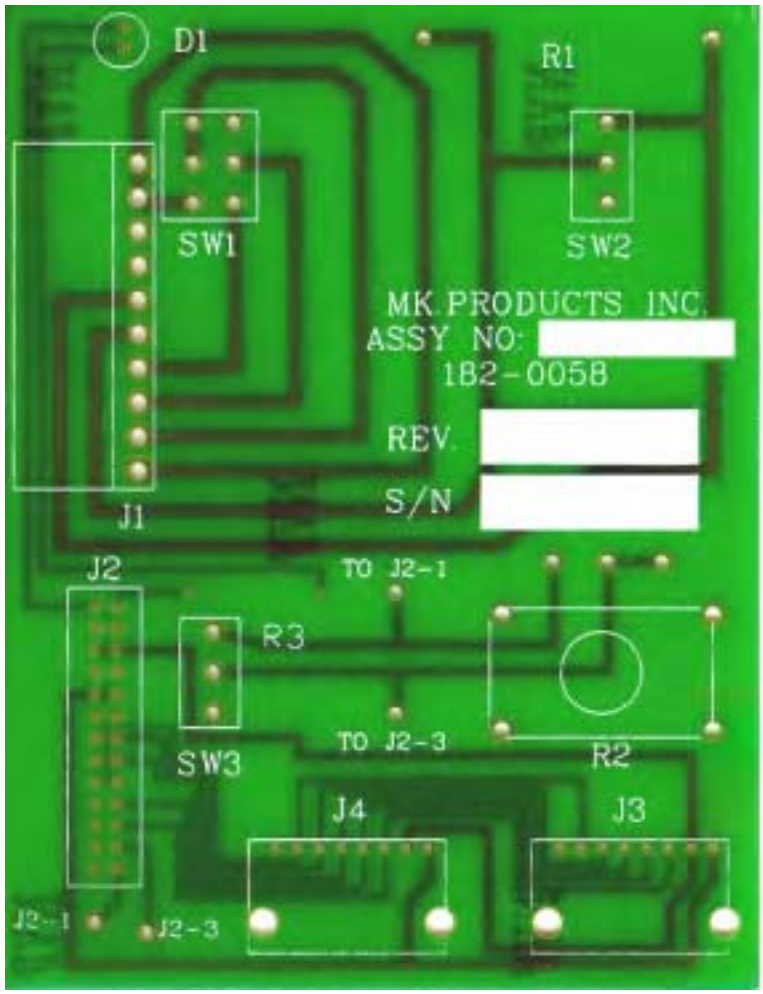
COMPONENTS TO BE REPLACED BY QUALIFIED SERVICE PERSONNEL ONLY.

MK P/N 003-1721
MAIN P.C. BOARD
PARTS LIST

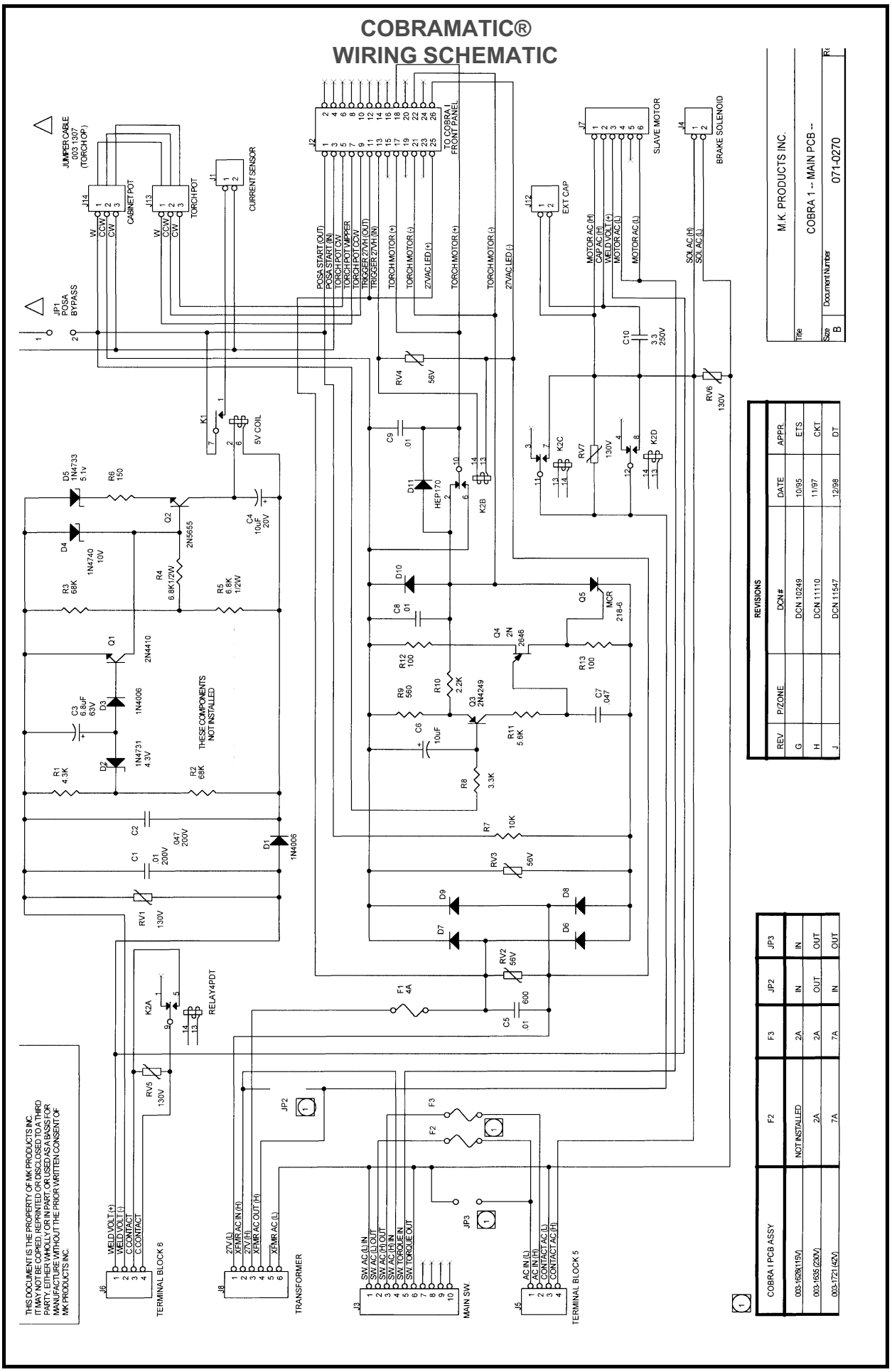
COMPONENT #	MK P/N	DESCRIPTION
K1	157-0144	RELAY, 5V 500 Ohm 200MA
R3	115-0154	RESISTOR, carbon .25 watt 6.8K ohm
R4, R5	115-0042	RESISTOR, carbon .50 watt 6.8K ohm
R12, R13	115-0120	RESISTOR, carbon .25 watt 100 ohm
R6	115-0122	RESISTOR, carbon .25 watt 150 ohm
R7	115-0144	RESISTOR, carbon .25 watt 10K ohm
R8	115-0138	RESISTOR, carbon .25 watt 3.3K ohm
R9	115-0129	RESISTOR, carbon .25 watt 560 ohm
R10	115-0136	RESISTOR, carbon .25 watt 2.2K ohm
R11	115-0141	RESISTOR, carbon .25 watt 5.6K ohm
D1	124-0002	DIODE, 1 amp 800 volts (IN4006)
D6-D10	124-0003	DIODE, 2.5 amps 1KV (HEP170)
D4	124-0011	DIODE, zener 1 watt 10 volts (IN4740)
D5	124-0012	DIODE, zener 1 watt 6.8 volts (IN4736)
Q2	122-0011	TRANSISTOR, NPN 500MA 250 volts (2N5655)
Q3	122-0004	TRANSISTOR, PNP 1 amp 50 volts (2N4249)
Q4	122-0013	TRANSISTOR, unijunction 30 volts (2N2646)
Q5	125-0028	THYRISTOR, 8 amps 400 volts (MCR218-6)
C1, C5, C8, C9	101-0016	CAPACITOR, ceramic .01uf 600VDC
C2	101-0013	CAPACITOR, Poly .047uf 200VDC
C3	104-0060	CAPACITOR, electrolytic 6.8uf 63 VDC
C4, C6	104-0002	CAPACITOR, tantalum 10uf 20VDC
C7	101-0021	CAPACITOR, ceramic .047uf 50VDC
RV1, RV5, RV6, RV7	124-0026	VARISTOR, 130 volts 10 amps
RV2, RV3, RV4	124-0028	VARISTOR, 56 volts 8 amps
J1	153-0866	CONNECTOR, R/A header 2 pin
J2	153-0923	TERMINAL, header 26 pin
J3	153-0842	TERMINAL, header 10 pin
J4	153-0844	TERMINAL, header 2 pin
J5, J6	186-0057	TERMINAL, strip 4 pin
J7, J8	153-0850	CONNECTOR, 6 pin
J13, J14	153-0867	CONNECTOR, R/A header 3 pin
Fuse Holder	152-0008	FUSE HOLDER, PC mount
F1	151-0043	FUSE, 3AG 4A 250V
F2, F3	151-0021	FUSE, MDA7 7A Slow Blow
K2	157-0022	RELAY, 24VAC 4PDT
K2 Socket	173-0026	SOCKET, relay 15 pin
Jumper	003-1307	JUMPER CABLE
Clip	157-0023	Relay Clip

MK P/N 003-2001
FRONT PANEL CIRCUIT BOARD

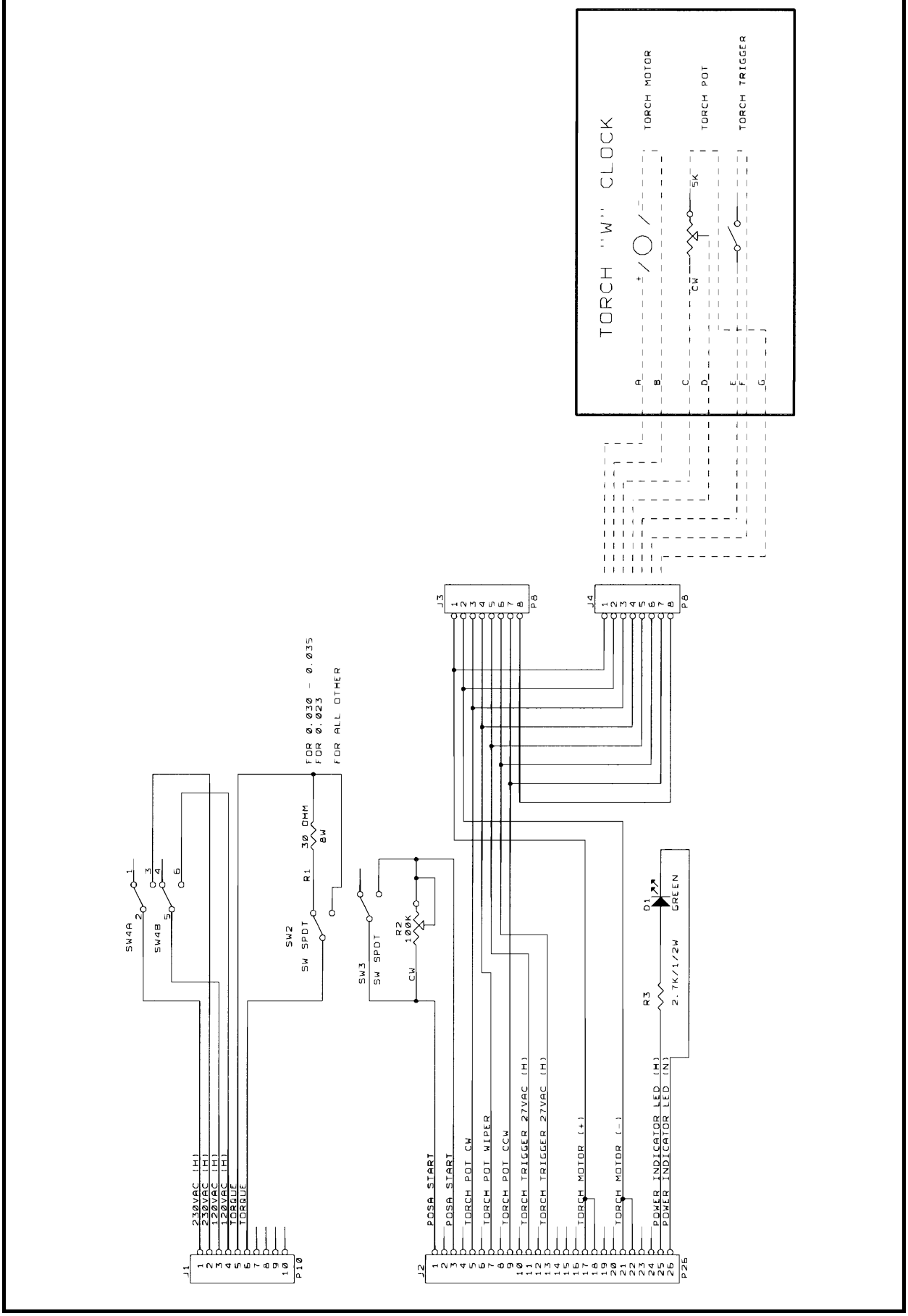
COMPONENT #	MK P/N	DESCRIPTION
R1	113-0062	RESISTOR, wire wound 30 ohm, 8 watt
R2	119-0020	POTENTIOMETER, 100K ohm
R3	115-0037	RESISTOR, carbon 2.7K ohm, 1/2 watt
D1	124-0045	LED, green
SW1	159-3587	SWITCH, DPDT, p.c. mount
SW2	159-3586	SWITCH, SPDT, p.c. mount
SW3	159-3586	SWITCH, SPDT p.c. mount
J1	153-0842	HEADER, 10pin, 90 degree
J2	153-0924	HEADER, 26pin, 90 degree
J3	153-0860	HEADER, 8pin, 90 degree
J4	153-0860	HEADER, 8pin, 90 degree



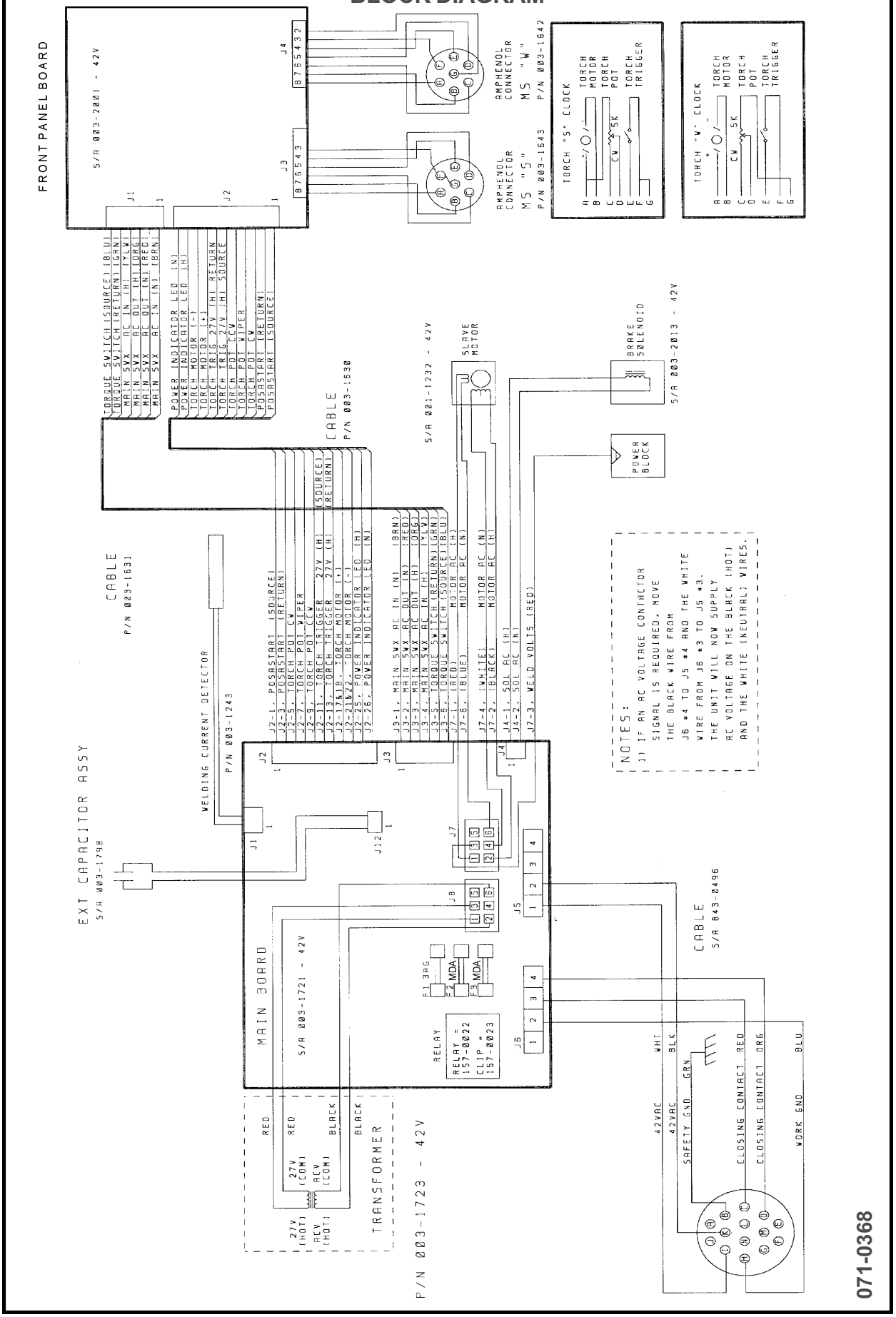
COMPONETS TO BE REPLACED BY QUALIFIED SERVICE PERSONNEL ONLY.


COBRAMATIC®
WIRING SCHEMATIC
M.K. PRODUCTS INC.
COBRA 1 - MAIN PCB --
071-0270
REVISIONS
REV | P/ZONE | DCN# | DATE | APPR.
G | | DCN 10249 | 10/95 | ETS
H | | DCN 11110 | 11/97 | CKT
J | | DCN 11547 | 12/98 | DT
COBRA I PCB ASSY | F2 | F3 | JP2 | JP3
003-1628(115V) | NOT INSTALLED | 2A | IN | IN
003-1635 (230V) | 2A | 2A | OUT | OUT
003-1721 (42V) | 7A | 7A | IN | OUT
THIS DOCUMENT IS THE PROPERTY OF MK PRODUCTS INC. IT MAY NOT BE COPIED, REPRINTED OR DISCLOSED TO A THIRD PARTY, EITHER WHOLLY OR IN PART, OR USED AS A BASIS FOR MANUFACTURE WITHOUT THE PRIOR WRITTEN CONSENT OF MK PRODUCTS INC.
JUMPER CABLE 003-1637 (TORCH OP.)
JP1 POSA BYPASS
CABINET POT
TORCH POT
CURRENT SENSOR
TO COBRA I FRONT PANEL
EXT CAP
SLAVE MOTOR
BRAKE SOLENOID
THESE COMPONENTS NOT INSTALLED
RELAY4PDT
TERMINAL BLOCK 6
TRANSFORMER
MAIN SW.
TERMINAL BLOCK 5

COBRAMATIC®
TORCH CONNECTIONS



COBRAMATIC®
BLOCK DIAGRAM



MK WARRANTY REPAIR STATIONS

for MK Products

ALABAMA

AIRGAS MID-SOUTH
Birmingham, AL
205/251-6835

WELDING ENGINEERING SUPPLY CO.
Prichard, AL
334/457-8681

ARIZONA

PRAXAIR
Phoenix, AZ
602/269-2151

ARKANSAS

APPLIED SERVICES, INC.
Benton, AR
501/860-6464

RELIABLE WELDING REPAIR
Greenwood, AR
501/996-6688

CALIFORNIA

ADVANCED WELDER REPAIR
Commerce, CA
323/263-7383

ARC PRODUCTS
San Diego, CA
619/628-1022

CAL-WELD SUPPLY
Fresno, CA
209/445-0131

EMCO EAST
Concord, CA 94520

PRAXAIR DISTRIBUTION (ARC RENT)
Long Beach, CA
562/427-0099

R. J. KATES
San Diego, CA
619/565-6960

RED-D-ARC, INC.
Carson, CA

SO-CAL AIRGAS
Gardena, CA
310/523-9355

COLORADO

INDUSTRIAL GAS PROD. & SUPPLY
Colorado Springs, CO
719/473-1947

WELDERS & EQUIP. SVC. & TESTING
Littleton, CO
303/932-8755

WESTERN SLOPE WELDER REPAIR
Grand Junction, CO
970/243-9616

FLORIDA

A & I SPECIALTIES
Lehigh Acres, FL
941/368-7435

ACTION WELDING SUPPLY
Jacksonville, FL
904/786-2254

AMVEL CORPORATION
Miami, FL
305/592-5678

ELECTRICAL WELDERS SERVICE
Orlando, FL 32808
407/290-9551

HOLOX LTD.
Merrit Island, FL
407/454-4106

HAUN SYSTEMS REPAIR
Orlando, FL
407/872-0011

ROPER ELECTRIC MOTOR SERVICE
Panama City, FL 32405
850/769-6643

SMITTY'S WELDER SERVICE
West Palm Beach, FL
561/845-1224

TRI-GAS
Miami, FL
305/592-3180

GEORGIA

MC CULLOUGH ELEC. MOTOR SVC.
Atlanta, GA
404/688-5251

MK WARRANTY REPAIR STATIONS

for MK Products

B&W INDUSTRIAL SERVICES
Augusta, GA
706/738-8722

IDAHO

NORCO
Boise, ID
208/336-1643

ILLINOIS

BODINE ELECTRIC OF DECATUR
Decatur, IL
217/423-2593

INDUSTRIAL WELDER REBUILDERS
Alsip, IL
708/371-5688

PCI ENERGY SERVICES
Lake Bluff, IL
847/680-8100

RELIABLE EQUIPMENT REPAIR
Hamel, IL
618/633-5000

INDIANA

APCO GAS TECH
Speedway, IN
317/481-4550

EVANSVILLE ARMATURE, INC.
Evansville, IN
812/428-9034

IOWA

CENTRAL STATES AIRGAS
Des Moines, IA
515/266-1111

CEDAR RAPIDS WELDING SUPPLY
Cedar Rapids, IA
319/365-1466

KANSAS

KANOX
Hutchinson, KS
316/665-5551

KENTUCKY

GENERAL WELDING PRODUCTS
Louisville, KY
502/635-5218

LOUISIANA

GREENE WELDING SUPPLY
West Monroe, LA
318/340-9206

RED BALL OXYGEN CO.
Shreveport, LA
318/425-3211

MICHIGAN

APEX WELDING GASES & SUPPLY
Muskegon Heights, MI
616/722-3185

WESAR COMPANY
Three Rivers, MI
616/483-9125

MINNESOTA

MINNEAPOLIS OXYGEN CO.
Minneapolis, MN
612/588-8855

OXYGEN SERVICE CO.
St. Paul, MN
612/644-7273

MISSOURI

CEE-KAY SUPPLY, INC.
St. Louis, MO
324/644-3500

P.G. WALKER
Springfield, MO
417/862-1745

NORTH CAROLINA

INDUSTRIAL MAINTENANCE OVERFLOW
Fletcher, NC
704/684-2000

M & L WELDER REPAIR
Asheville, NC
828/250-9353

MACHINE & WELDING SUPPLY CO.
Dunn, NC
910/892-4016

NATIONAL WELDERS
High Point, NC
910/882-1110

MK WARRANTY REPAIR STATIONS

for MK Products

NORTH CAROLINA (contd.)
NATIONAL WELDERS SUPPLY CO.
Charlotte, NC
704/392-7317

OHIO

ALBRIGHT WELDING SUPPLY
Wooster, OH
330/264-2021

ARC EQUIPMENT COMPANY
Struthers, OH 44471
333/750-9353

CnD MACHINE, INC.
Canton, OH 44706
330/478-8811

VALLEY NATIONAL GASES
Lima, OH
419/228-1008

RICK'S WELDER REPAIR SERVICE
Eastlake, OH
440/269-1204

VALLEY NATIONAL GASES
Toledo, OH
419/241-9114

WELDINGHOUSE, INC.
Cleveland, OH
216/524-1955

OKLAHOMA

BILL'S WELDER REPAIR
Oklahoma City, OK
405/232-4799

AIRGAS MID-SOUTH
Tulsa, OK
918/582-0885

RITE-WELD SUPPLY, INC
dba OKLAHOMA WELDERS SUPPLY
Madill, OK
580/795-5561

PENNSYLVANIA

GEOVIC WELDING SUPPLY
Milton, PA
717/742-9377

J.A. CUNNINGHAM EQUIPMENT, INC.
Philadelphia, PA
215/426-6650

VALLEY NATIONAL GASES
Pittsburgh, PA
412/281-1835

SOUTH CAROLINA

IND'L ELECTRIC REWINDING CO. OF SUMTER
Sumter, SC
803/773-9366

TENNESSEE

NEXAIR
Memphis, TN
901/523-6821

TEXAS

AIRGAS HOUSTON
Houston, TX
713/462-8027

DENISON OXYGEN
Denison, TX
903/465-3369

RITE-WELD SUPPLY, INC
Fort Worth, TX
817/626-8237

VIRGINIA

NORFOLK WELDERS SUPPLY
Norfolk, VA
804/622-6571

WASHINGTON

A-L WELDING PRODUCTS
Tukwila, WA
425/228-2218

CASCADE AIRGAS/WELDER'S SUPPLY
Seattle, WA
206/224-0433

OXARC, INC
Spokane, WA
509/535-7794

OXYGEN SALES & SERVICE, INC
Tacoma, WA
253/473-2282

MK WARRANTY REPAIR STATIONS

for MK Products

PACIFIC WELDING SUPPLIES
Tacoma, WA
253/572-5302

PRAXAIR
Seattle, WA
206/624-7033

AMERICAN EQUIPMENT SERVICES
Kent, WA
253/395-9947

WISCONSIN

BENTLEY WELDING SUPPLY
Brookfield, WI
414/938-6365

CANADA

ARC & GENERATOR REPAIR
Garson, Ontario
705/525-2141

INDUSTRIAL ELECTRONIC SERVICES
Calgary, Alberta
403/279-3432

M.R.T. REPAIR CENTER, INC.
Montreal, Québec
514/648-0800

OZARK ELECTRICAL MARINE LTD.
St. John's Newfoundland

PEEL ENGINES
Mississauga, Ontario
905/670-1535

PROMOTECH électrique, Inc.
Fleurimont, Québec
819/822-2111

WELDERS SUPPLY
Winnipeg, Manitoba
204/772-9476

WELDING WIDE SERVICES, INC.
Brampton, Ontario
905/874-9992

WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre.	● Gardez à l'écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ● 施工物やアースから身体が絶縁されている様にして下さい。	● 燃えやすいものの側での溶接作業は絶対にしてはなりません。	● 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	● 皮肤或湿衣物切勿接触带电部件及焊条。 ● 使你自己与地面和工件绝缘。	● 把一切易燃物品移离工作場所。	● 佩戴眼、耳及身體劳動保護用具。
Korean **위 험**	● 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ● 모재와 접지를 접촉치 마십시요.	● 인화성 물질을 접근 시키지 마시요.	● 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone.	● Turn power off before servicing.	● Do not operate with panel open or guards off.	**WARNING**
● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.	● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	● No operar con panel abierto o guardas quitadas.	Spanish **AVISO DE PRECAUCION**
● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	● Débranchez le courant avant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French **ATTENTION**
● Vermeiden Sie das Einatmen von Schweibrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German **WARNUNG**
● Mantenha seu rosto da fumaça. ● Use ventilação e exhaustão para remover fumo da zona respiratória.	● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas.	● Mantenha-se afastado das partes moventes. ● Não opere com os painéis abertos ou guardas removidas.	Portuguese **ATENÇÃO**
● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。	● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切って下さい。	● パネルやカバーを取り外したままで機械操作をしないで下さい。	Japanese **注意事項**
● 頭部遠離煙霧。 ● 在呼吸區使用通風或排風器除煙。	● 維修前切斷電源。	● 當表板打開或沒有安全罩時不準作業。	Chinese **警 告**
● 얼굴로부터 용접가스를 멀리하십시요. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	● 보수전에 전원을 차단하십시요.	● 판넬이 열린 상태로 작동치 마십시요.	Korean **위 험**
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهربائي قبل القيام بأية صيانة.	● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.	Arabic **تحذير**

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的說明以及應該使用的銀焊材料，並請遵守貴方的有関勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.

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LIMITED WARRANTY

Effective April 1, 1998

This warranty supersedes all previous MK Products warranties and is exclusive, with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY - MK Products, Inc., Irvine, California warrants that all new and unused equipment furnished by MK Products is free from defect in workmanship and material as of the time and place of delivery by MK Products. No warranty is made by MK Products with respect to trade accessories or other items manufactured by others. Such trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any.

MK Products' warranty does not apply to components having normal useful life of less than one (1) year, such as relay points, wire conduit, tungsten, and welding torch parts that come in contact with the welding wire, including nozzles, nozzle insulators, and contact tips where failure does not result from defect in workmanship or material.

In the case of MK Products' breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be at MK Products' option: **(1)** repair; **(2)** replacement; **(3)** where authorized in writing by MK Products, the reasonable cost of repair or replacement at our Irvine, California plant; or **(4)** payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Upon receipt of notice of apparent defect or failure, MK Products shall instruct the claimant on the warranty claim procedures to be followed.

As a matter of general policy only, MK Products may honor an original user's warranty claims on warranted equipment in the event of failure resulting from a defect within the following periods from the date of delivery of equipment to the original user:

1. **Torches and Weldheads ..... 1 year**
2. **All Other Equipment ..... 3 years**
3. **Repairs ..... 90 days**

Classification of any item into the foregoing categories shall be at the sole discretion of MK Products. Notification of any failure must be made in writing within 30 days of such failure.

A copy of the invoice showing the date of sale must accompany products returned for warranty repair or replacement.

All equipment returned to MK Products for service must be properly packaged to guard against damage from shipping. MK Products will not be responsible for any damages resulting from shipping.

Normal surface transportation charges (both ways) for products returned for warranty repair or replacement will be borne by MK Products, except for products sold to foreign markets.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY, OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE, OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MK PRODUCTS, IS EXCLUDED AND DISCLAIMED BY MK PRODUCTS.

EXCEPT AS EXPRESSLY PROVIDED BY MK PRODUCTS IN WRITING, MK PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL/INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND NOT FOR CONSUMERS OR CONSUMER USE. MK PRODUCTS WARRANTIES DO NOT EXTEND TO, AND NO RE-SELLER IS AUTHORIZED TO EXTEND MK PRODUCTS' WARRANTIES TO ANY CONSUMER.

MK Products, Inc.
16882 Armstrong Ave.
Irvine, CA 92606
Tel (949)863-1234
Fax (949)474-1428

FORM : LW-8
DATE : April 1, 1998

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